

8.25 WICOMICO COUNTY

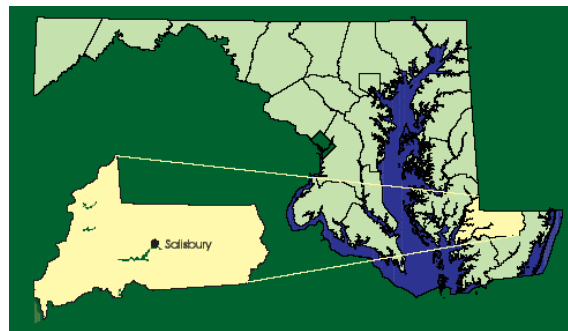
This chapter presents information about stream conditions of potential management interest in Wicomico County based on the 2000-2004 Maryland Biological Stream Survey (MBSS) results. Information from MBSS data collected between 1994 and 1997 can be found in MDNR 2001w.

8.25.1 Ecological Health

Based on the three ecological health indicators used by the MBSS, the overall condition of Wicomico County streams during 2000-2004 was Fair (Figure 8-204). The FIBI results indicate that 26% of the streams in the county were in Good condition, and only 14% rated Good using the BIBI. In contrast, 50% of the streams in the county scored as Poor or Very Poor using the CBI, while 14% scored as Good and 38% scored as Fair. It should be noted that 22% of stream miles were not rated for fish (FIBI) either because some sites met the criteria for blackwater streams and had Poor or Very Poor FIBI scores or because they were dry and unsampleable for fish. There are no remaining blackwater streams in Maryland healthy enough to serve as reference sites for FIBI development, so these streams were not rated for fish.

No strong geographic trend was evident in IBI scores, but the area east of Salisbury had a pronounced cluster of sites rated as Very Poor. The highest rated stream in Wicomico County using the Combined Biotic Index (CBI) was Nassawango Creek (Table 8-49). In contrast, the lowest rated streams included Burnt Mill Branch, Beaverdam Creek and Campbell Ditch. Based on Stream Waders data, sites rated as Very Poor for benthic macroinvertebrates outnumbered all other ratings combined in every watershed in the county (Table 8-50). No Stream Wader sites in Wicomico County were rated Good.

Two MBSS Sentinel sites were located in Wicomico County, Leonard Pond Run and Nassawango Creek. Sentinel sites were chosen to provide a representation of the best remaining streams around the state and track natural variations in stream health. Where possible, Sentinel sites are located in watersheds with as much protected land as possible, or in areas projected to become degraded from development at a slower pace. More information about the MBSS Sentinel stream network is found in: 2000-2004 Maryland Biological Stream Survey Volume 11: Sentinel Sites (http://www/dnr/Maryland.gov/streams/pubs/ea05-8_sentinel.pdf).



8.25.2 Physical Habitat

8.25.2.1 Overall Condition

Based on the Physical Habitat Index (PHI), 33% of the streams in Wicomico County had Minimally Degraded habitat, 37% had Partially Degraded habitat, and 29% had Degraded or Severely Degraded habitat (Figure 8-205). Severely Degraded sites occurred primarily east of Salisbury, Maryland, especially along the eastern border of the county.

8.25.2.2 Trash

Nearly 55% of the stream miles in Wicomico County were rated Optimal for trash (Figure 8-206). In contrast, 14% of streams were rated as Marginal or Poor for trash. Sites with higher trash levels occurred primarily along the Route 50 corridor.

8.25.2.3 Channelization

About 52% of the stream miles in Wicomico County were channelized to some extent (Table 8-4). The types of channelization found at MBSS sites were earthen ditches (43%), pipe culverts, and gabion baskets. No geographic pattern in channelization was evident (Figure 8-207).

8.25.2.4 Inadequate Riparian Buffer

Nearly 19% of the stream miles in Wicomico County had no riparian buffers during the 2000-2004 MBSS (Table 8-3). In addition, 19% of stream miles had severe breaks in existing riparian buffers. Sites with no buffer and sites with buffer breaks were both more frequently observed in the eastern portion of the county (Figure 8-208). Additional information about buffer breaks, analyzed by

county, is provided in: 2000-2004 Maryland Biological Stream Survey Volume 10: Riparian Zone Conditions (http://www/dnr/Maryland.gov/streams/pubs/ea05-7_riparian.pdf).

8.25.2.5 Eroded Banks/Bedload Movement

Nearly 88% of the stream miles in Wicomico County were rated as having minimal (Optimal) bank erosion (Figure 8-209). No streams were rated Poor, and only 8% were rated as Marginal for bank erosion. One likely reason for the low amount of bank erosion in the county is the amount of channelization via ditching that has occurred. There was no apparent geographic pattern in the distribution of sites with erosion problems.

Nearly 33% of the stream miles in Wicomico County were rated as having minor bar formation, and an additional 51% had moderate bar formation (Figure 8-209). Almost 17% of stream miles had extensive bar formation, and no streams were devoid of bars. There was no apparent geographic pattern in the extent of bar formation.

8.25.3 Key Nutrients

8.25.3.1 Nitrate-Nitrogen

Almost 61% of the stream miles in Wicomico County had elevated levels of nitrate-nitrogen (Figure 8-210). Over

46% of stream miles had levels between 1 and 5 mg/l. The remaining 15% were above 5 mg/l, the level at which biological impacts have been documented. There was no clear, broad-scale pattern in nitrate-nitrogen levels in the county.

8.25.3.2 Total Phosphorus

Nearly 67% of the stream miles in Wicomico County had elevated levels of total phosphorus (Figure 8-211). Almost 26% of stream miles had levels beyond the threshold where biological effects may occur. With the exception of one or two sites, total phosphorus levels were low in the western part of the county and higher elsewhere.

8.25.4 Stream and River Biodiversity

To provide a means to prioritize stream systems for biodiversity protection and restoration within each county and on a statewide basis, a tiered watershed and stream reach prioritization method was developed. Special emphasis was placed on state-listed species, stronghold watersheds for state-listed species, and stream reaches with one or more state-listed aquatic fauna. Fauna considered included stream salamanders, freshwater fishes, and freshwater mussels. Rare, pollution-sensitive benthic macroinvertebrates collected during the 1994-2004 MBSS were also used to identify the suite of watersheds necessary to conserve the full array of known stream and river biota in Maryland. A complete description of the biodiversity ranking process is found in: 2000-2004 Maryland Biological Stream Survey Volume 9: Stream and Riverine Biodiversity (http://www/dnr/Maryland.gov/streams/pubs/ea05-6_biodiv.pdf).

Of the four watersheds found in Wicomico County, Dividing Creek/Nassawango Creek was classified as Tier 1, meaning that this watershed serves as a stronghold for one or more state listed aquatic species (Figure 8-212). The Upper Pocomoke and Nanticoke River watersheds were classified as Tier 2, meaning that these watersheds serve as strongholds for one or more non-state listed species of Greatest Conservation Need (GCN), and also have one or more state-listed aquatic species. In contrast, the Lower Wicomico River/Monie Bay/Wicomico Creek/ Wicomico River Head watershed was among the lower ranking for stream and river biodiversity in the state (71st of 84). Any reaches that had either state-listed or GCN species, or high intactness values were highlighted to facilitate additional emphasis in planning restoration and protection activities.

AN IMPORTANT NOTE ON BIODIVERSITY MANAGEMENT

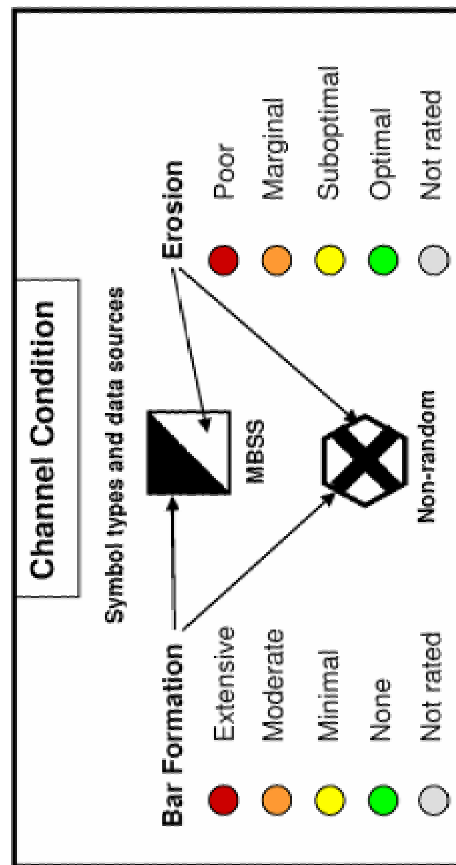
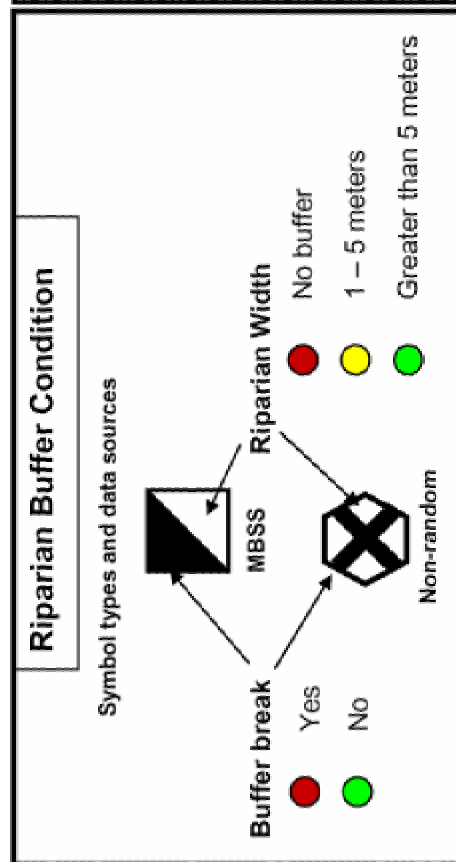
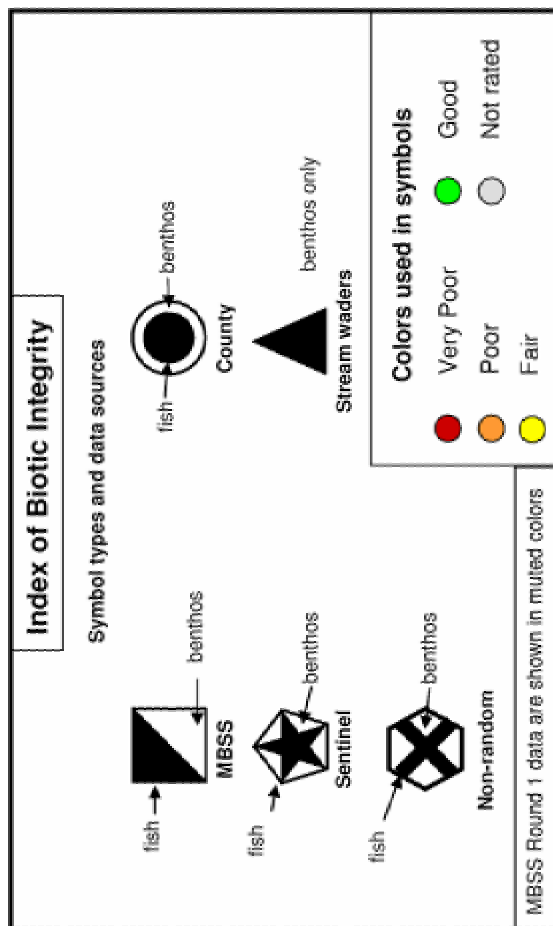
Perhaps the largest ongoing natural resources restoration and protection effort in Maryland is associated with the Chesapeake Bay. In most cases, freshwater biodiversity is not specifically considered during placement and prioritization of Bay restoration and protection projects. In this report and in the more detailed volume in the series on aquatic biodiversity, a system of biodiversity ranking is presented to provide counties and other stewards with a means to plan appropriate protection and restoration activities in locations where they would most benefit stream and river species. Given the historically low level of funding for biodiversity protection and restoration in Maryland and elsewhere, the potential benefit of incorporating freshwater biodiversity needs into other efforts is quite large.

However, it is important to note that although freshwater taxa are the most imperiled group of organisms in Maryland, other groups and individual species not typically found in freshwater habitats are also at high risk and constitute high priority targets for conservation. In addition, freshwater taxa that prefer habitats such as small wetlands may not be well-characterized by the ranking system employed here. To conserve the full array of Maryland's flora and fauna, it is clearly necessary to use other, landscape-based tools and consider factors such as maintaining or reconnecting terrestrial travel corridors.

8.25.5 Stressors

At 69% of stream miles, the most extensive stressor characterized by the MBSS in Wicomico County during the 2000-2004 MBSS was non-native terrestrial plants in the riparian zone (Figure 8-5). Other stressors found were: streams with non-native aquatic fauna (50% of stream miles); channelized streams (42% of stream miles); acid deposition (27% of stream miles); high nitrate-nitrogen (15% of stream miles); streams with no riparian buffer (19% of stream miles); low dissolved oxygen (20%); streams with >5% urban land use upstream (14%); and eroded banks (12%).

Key to MBSS 2000-2004 County Maps



Tier 1:	Stronghold watershed (most robust remaining population) for one or more state-listed fish, aquatic herpetofauna, or freshwater mussels.
Tier 2:	Stronghold watershed for one or more non-state listed species of greatest conservation need (GCN) fish, aquatic herpetofauna, or freshwater mussels, that also had state-listed fish, aquatic herpetofauna, or freshwater mussels present.
Tier 3:	Stronghold watershed for one or more non-state listed GCN fish, aquatic herpetofauna, or freshwater mussels, no state-listed fish, aquatic herpetofauna, or freshwater mussels present.
Tier 4:	Non-stronghold watershed with one or more state-listed fish, aquatic herpetofauna, or freshwater mussels present.
Tier 5:	Not of the above, but a biodiversity conservation watershed. In other words, part of the network of watersheds that must be conserved to keep all native fishes, aquatic herpetofauna, freshwater mussels, and rare, pollution sensitive benthic macroinvertebrates extant in Maryland.
Tier 6:	Not of the above.

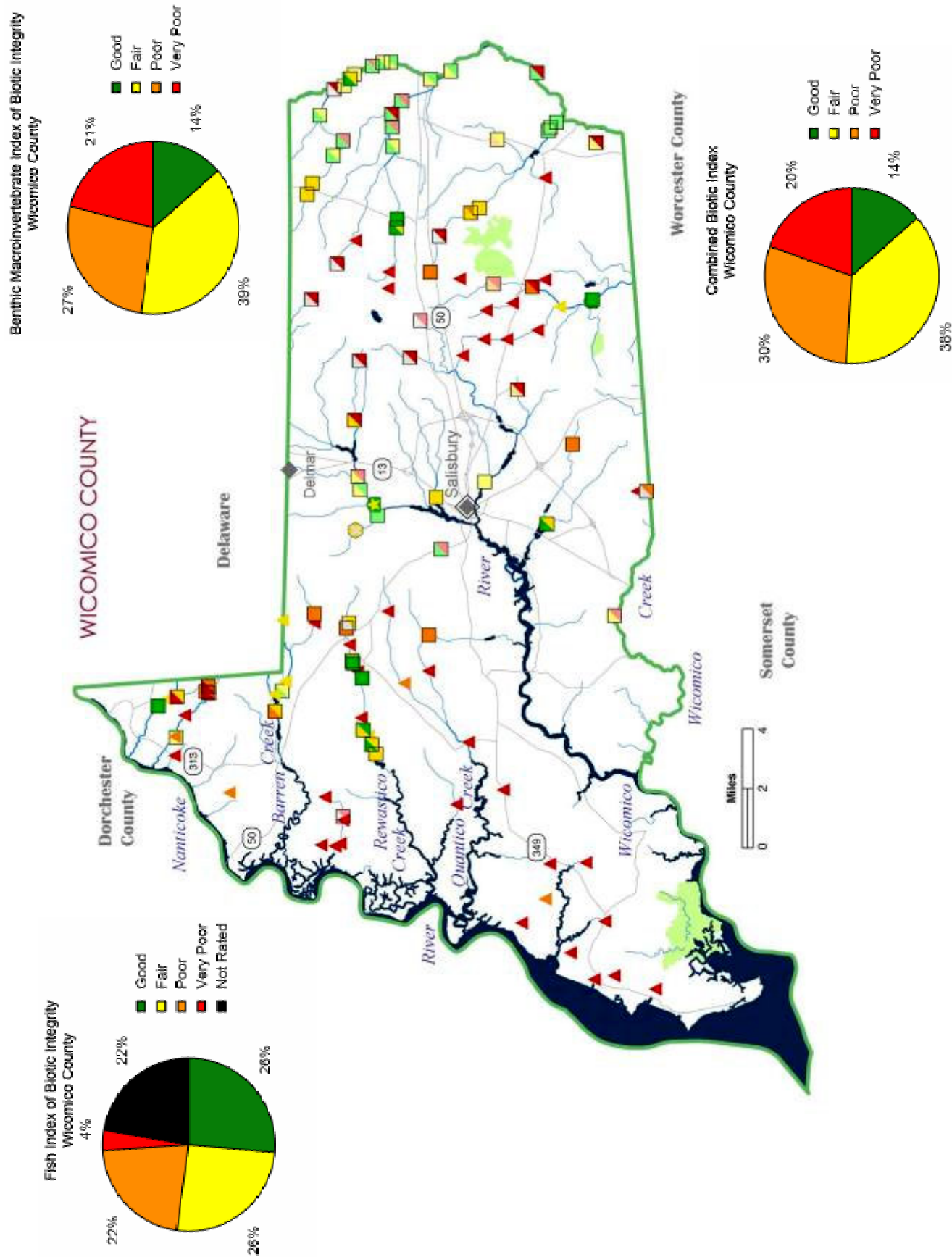


Figure 8-204. Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) pie charts and map of stream health for Wicomico County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie charts represent 2000-2004 data only, Combined Biotic Index pie chart represents mean of FIBI and BIBI)

Table 8-49. MBSS sites sampled in Wicomico County during 1994- 2004, ranked by Combined Biotic Index Score (CBI)

Wicomico County - MBSS Sites				
SITE NUMBER	STREAM NAME	WATERSHED	CBI	
<i>Best (in order of CBI score)</i>				
NASS-217-R-2001	Nassawango Creek	Nassawango Creek	4.67	
WL-S-057-311-97	Adkins Race	Pocomoke River Upper	4.55	
WL-S-082-113-95	Little Burnt Branch	Wicomico River Head	4.50	
UPPC-107-R-2001	Aydylotte Branch	Pocomoke River Upper	4.40	
NANT-107-R-2001	Rewastico Creek	Nanticoke River	4.26	
WL-S-057-319-97	Adkins Race	Pocomoke River Upper	4.26	
NANT-113-R-2002	Rewastico Creek	Nanticoke River	4.24	
NANT-203-R-2001	Plum Creek	Nanticoke River	4.21	
WIRH-220-S-2000	Leonard Pond Run	Wicomico River Head	4.21	
WL-S-023-112-95	Nanticoke River UT	Nanticoke River	4.19	
WIRH-220-S-2001	Leonard Pond Run	Wicomico River Head	4.19	
NANT-106-R-2002	Rewastico Creek	Nanticoke River	4.07	
NASS-301-S-2000	Nassawango Creek	Nassawango Creek	4.07	
WIRH-220-S-2002	Leonard Pond Run	Wicomico River Head	4.05	
WO-S-008-305-97	Pocomoke River	Pocomoke River Upper	4.02	
NANT-110-R-2002	Rewastico Creek	Nanticoke River	3.95	
LOWI-104-R-2000	Morris Pond	Wicomico River Lower	3.93	
WL-S-034-201-95	Barren Creek	Nanticoke River	3.93	
NANT-122-R-2002	Rewastico Creek	Nanticoke River	3.88	
WIRH-220-S-2004	Leonard Pond Run	Wicomico River Head	3.88	
WL-S-063-220-95	Leonard Pond Run	Wicomico River Head	3.88	
WL-S-067-207-97	Burnt Mill Branch	Pocomoke River Upper	3.81	
WO-S-061-206-97	North Fork Green Run	Pocomoke River Upper	3.79	
UPPC-410-R-2001	Pocomoke River	Pocomoke River Upper	3.79	
WO-S-003-306-97	Pocomoke River	Pocomoke River Upper	3.79	
<i>Worst (most degraded sites first)</i>				
WL-S-061-104-97	Burnt Mill Branch	Pocomoke River Upper	1.29	
LOWI-113-R-2000	Beaverdam Creek	Wicomico River Lower	1.57	
WL-S-084-107-97	Campbell Ditch	Pocomoke River Upper	1.57	
NANT-119-R-2001	Nanticoke River UT1	Nanticoke River	1.71	
NANT-102-R-2001	Nanticoke River UT1	Nanticoke River	1.86	
WO-S-061-205-97	North Fork Green Run	Pocomoke River Upper	1.86	
WIRH-109-R-2000	Leonard Pond Run	Wicomico River Head	1.86	
WIRH-114-R-2000	Morris Branch	Wicomico River Head	1.86	
WL-S-017-119-95	Walston Branch	Wicomico River Lower	1.93	
NASS-206-R-2001	Nassawango Creek	Nassawango Creek	1.95	
DIVI-110-R-2001	Dividing Creek	Dividing Creek	2.14	
NANT-116-R-2002	Barren Creek	Nanticoke River	2.21	
NANT-108-R-2001	Nanticoke River UT1 UT1	Nanticoke River	2.24	
NANT-111-R-2002	Rewastico Creek	Nanticoke River	2.36	
UPPC-115-R-2001	Campbell Ditch	Pocomoke River Upper	2.38	
WL-S-041-202-97	Perdue Creek	Wicomico River Lower	2.43	
WL-S-999-114-97	Duncan Ditch	Pocomoke River Upper	2.43	
WIRH-111-R-2000	Leonard Pond Run	Wicomico River Head	2.43	
LOWI-103-R-2000	Rockawalkin Creek	Wicomico River Lower	2.55	
LOWI-102-R-2000	White Marsh Creek	Wicomico River Lower	2.55	
WL-S-041-214-97	Forrest Grove Branch	Nassawango Creek	2.55	
WL-S-055-303-97	Pocomoke River	Pocomoke River Upper	2.64	
WL-S-085-102-95	Nanticoke River UT	Nanticoke River	2.71	
UPPC-105-R-2001	Campbell Ditch	Pocomoke River Upper	2.71	
NANT-108-R-2002	Plum Creek UT	Nanticoke River	2.76	

Table 8-50. Stream Waders sites sampled in Wicomico County during 2000-2004, ranked by Family-level Benthic Index of Biotic Integrity

Wicomico County - Stream Wader Sites				
WATERSHED	# GOOD	# FAIR	# POOR	# VERY POOR
Dividing Creek	0	0	0	1
Wicomico River Lower	0	4	3	10
Nanticoke River	0	5	5	28
Nassawango Creek	0	1	0	9
Pocomoke River Upper	0	0	1	8
Wicomico Creek	0	0	1	4
Wicomico River Head	0	0	2	10

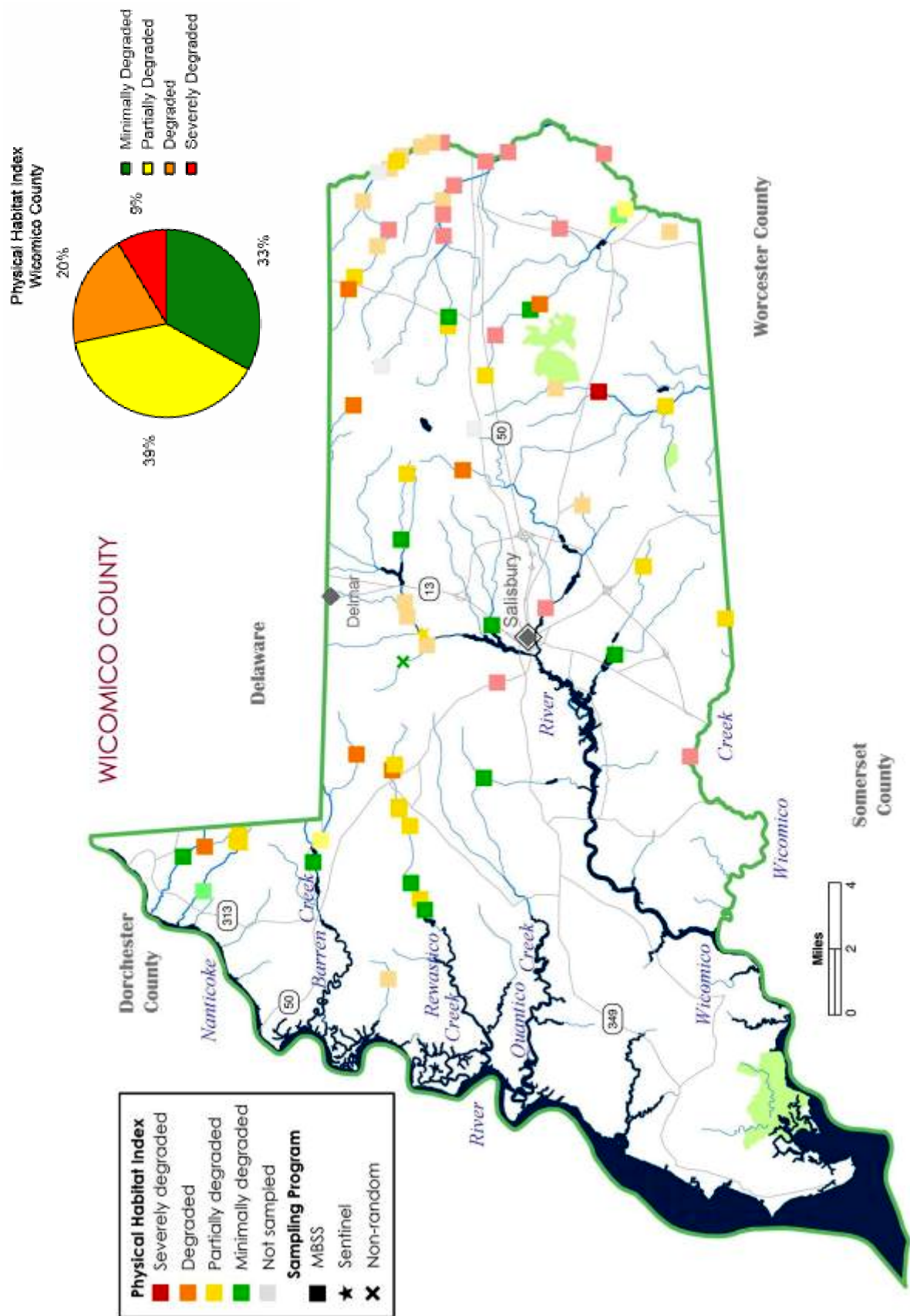


Figure 8-205. Physical Habitat Index (PHI) pie chart and map of stream habitat quality for Wicomico County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

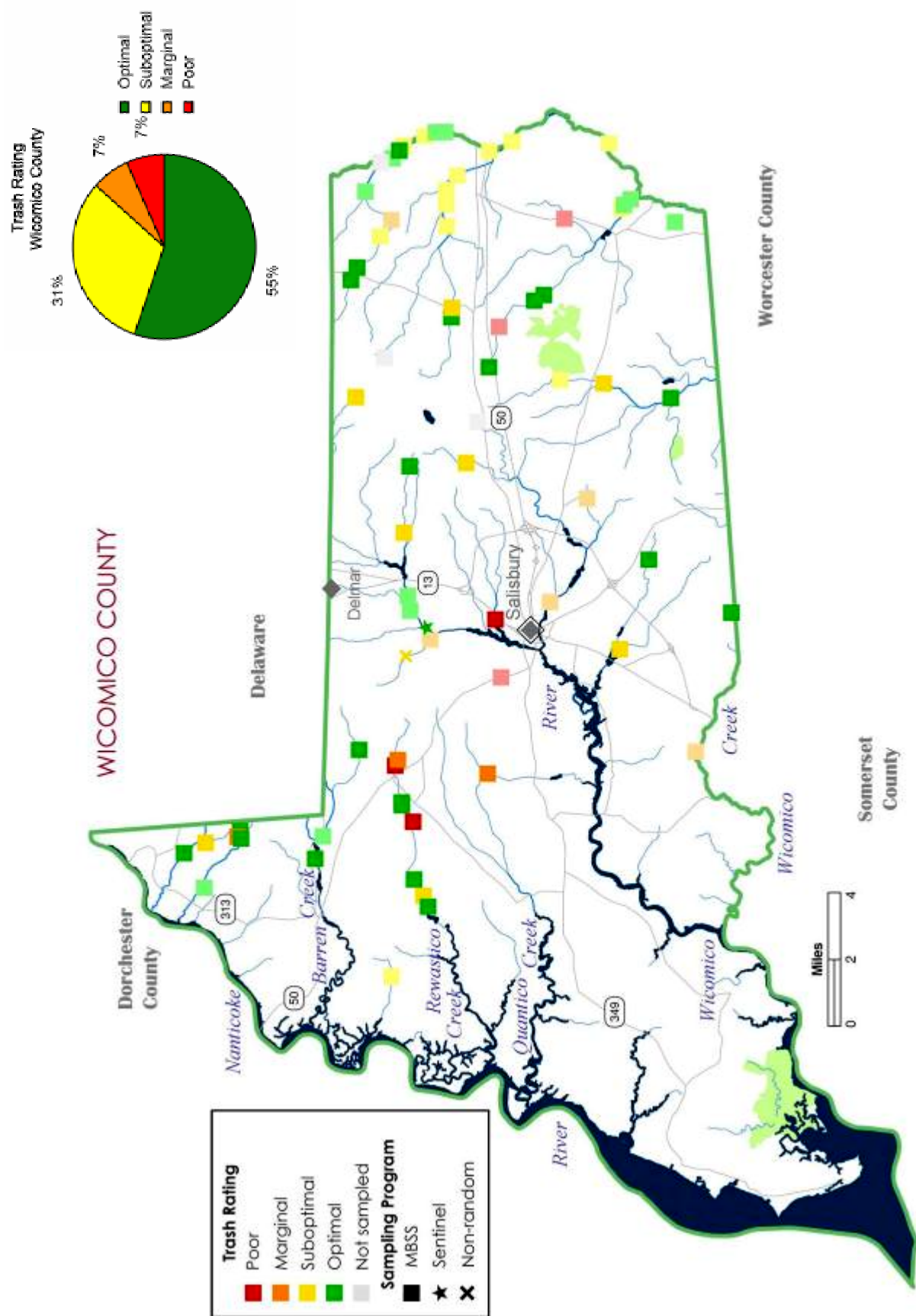


Figure 8-206. Pie chart and map of trash rating (0-20 scale) for Wicomico County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

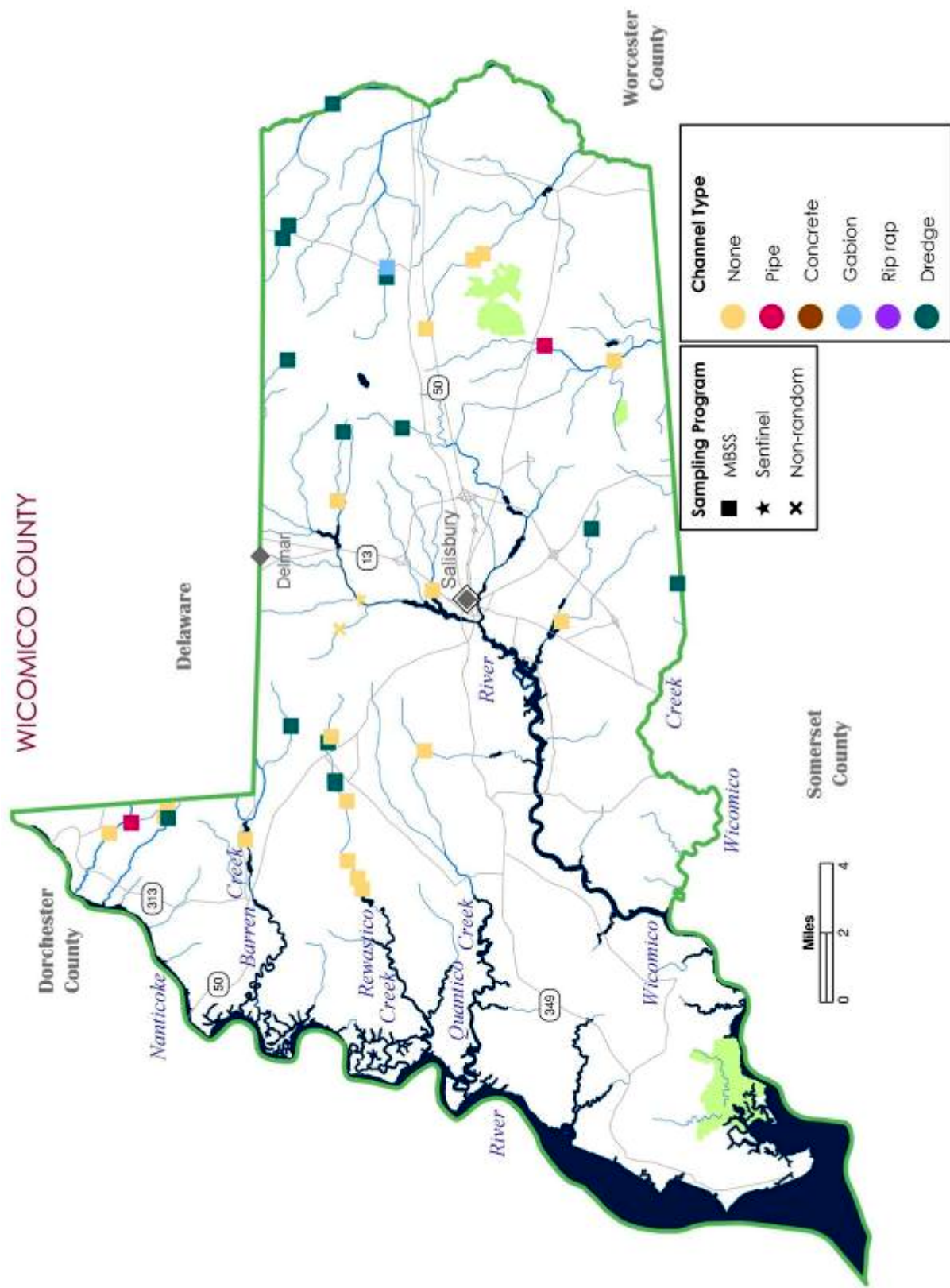


Figure 8-207. Map of channelized sites, by type, for Wicomico County streams sampled by the MBSS during 2000-2004. *NOTE: When channelization is indicated, it does not necessarily mean that the entire 75m segment was affected.*

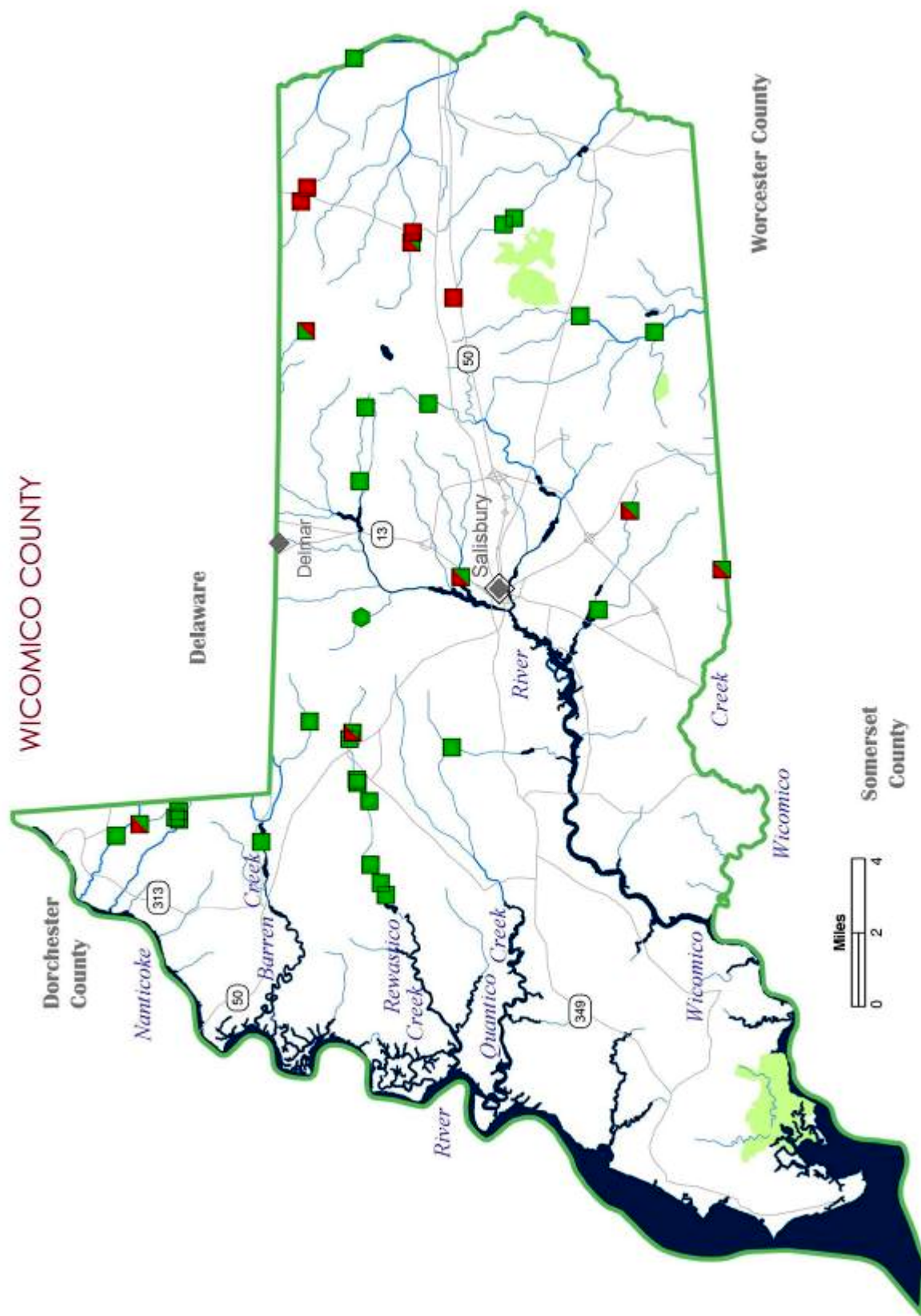


Figure 8-208. Map of sites with inadequate riparian buffers and buffer breaks for Wicomico County streams sampled by the MBSS during 2000-2004. *NOTE: Multiple riparian buffer breaks sometimes occurred at a site; only the most severe was depicted.*

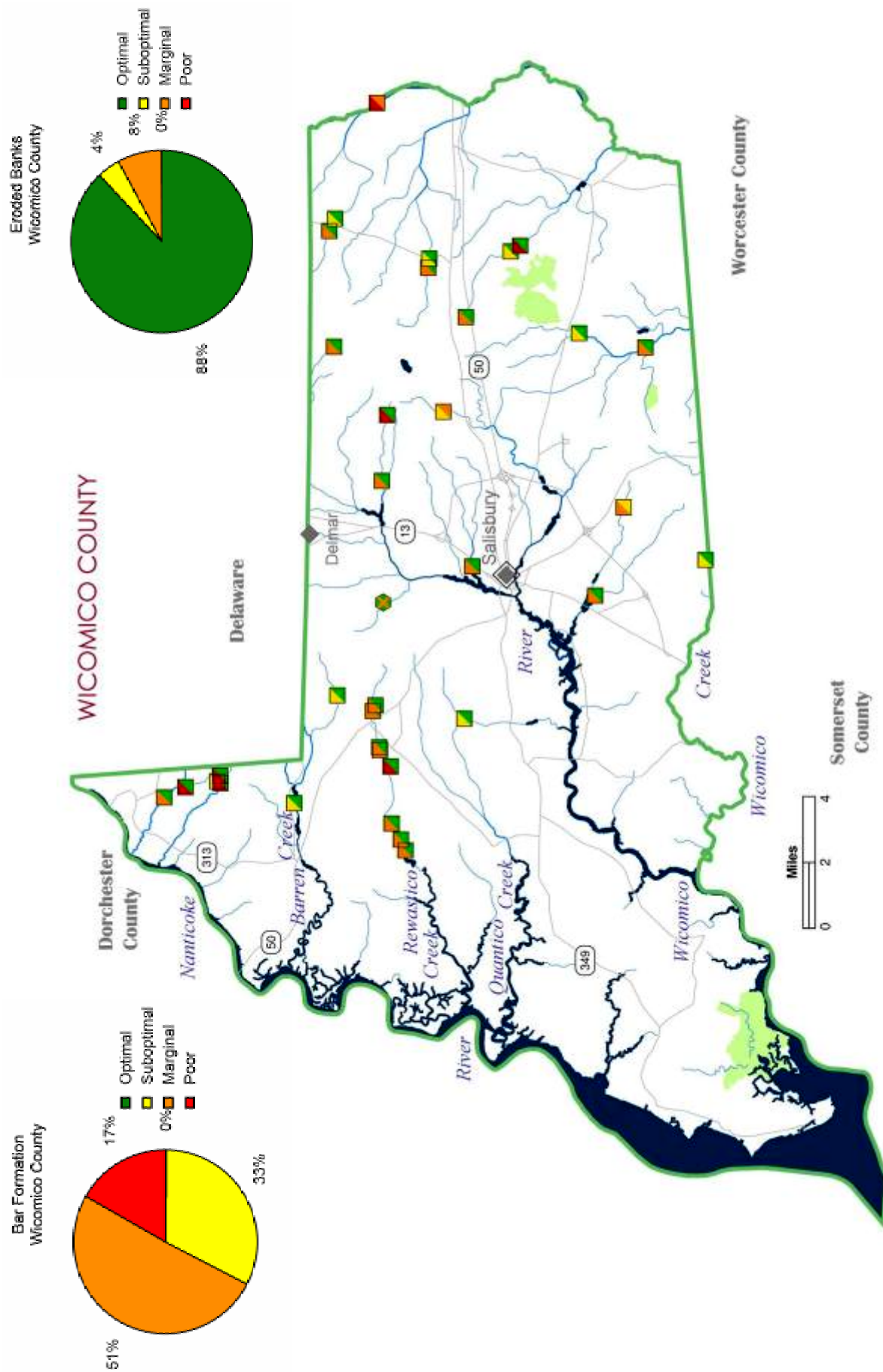


Figure 8-209. Pie charts and map of sites with eroded banks and instream bar formation for Wicomico County streams sampled by the MBSS during 2000-2004

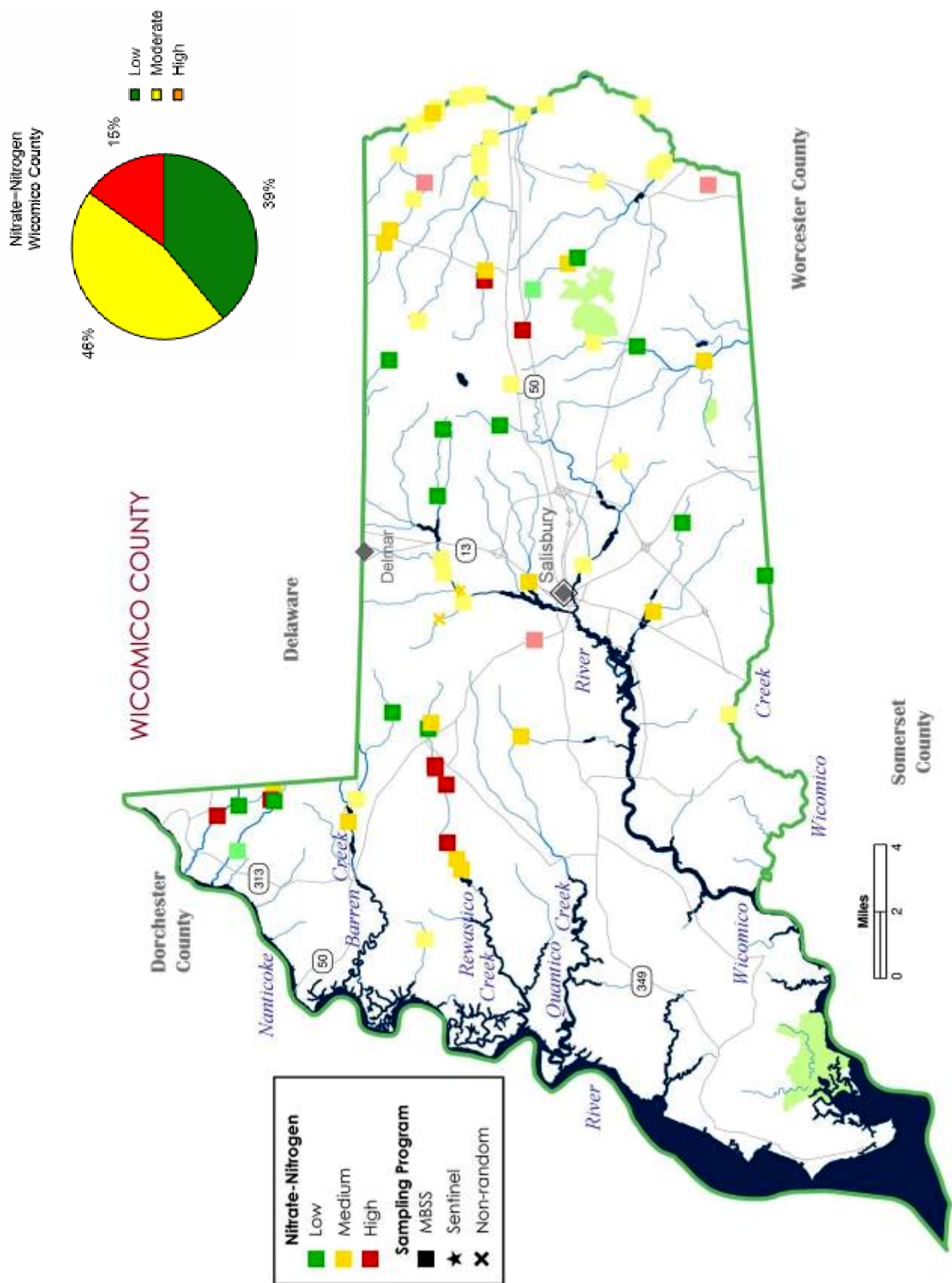


Figure 8-210. Pie chart and map of nitrate-nitrogen values (mg/l) for Wicomico County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only) (Low = 1.0 – 5.0, Medium = 1.0 – 5.0, High = > 5.0)

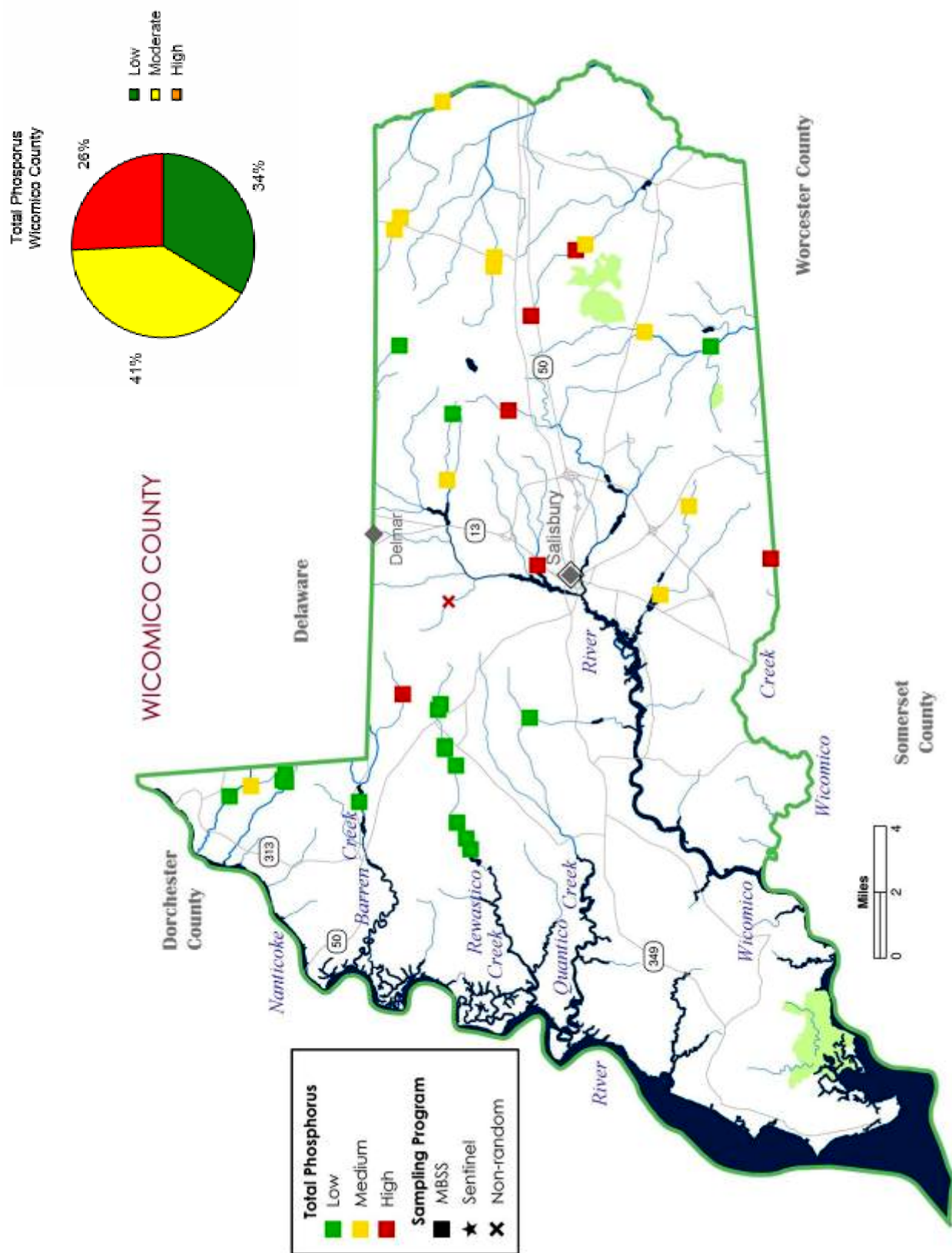


Figure 8-211. Pie chart and map of total phosphorus values (mg/l) for Wicomico County streams sampled by the MBSS during 2000-2004 (Low = < 0.025, Medium = 0.025 – 0.07, High = > 0.07)

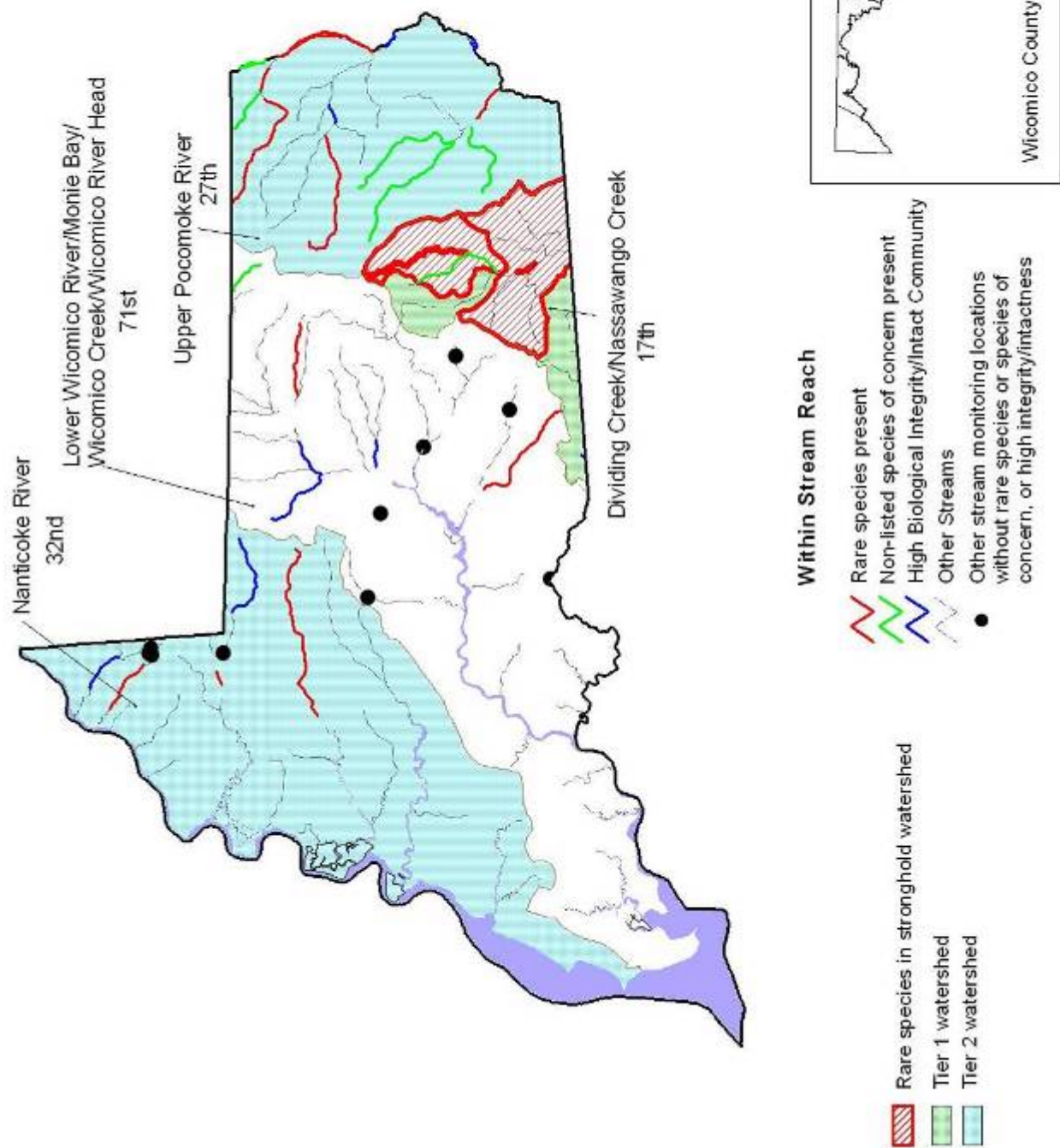


Figure 8-212. Aquatic Heritage Biodiversity Ranking map for Wicomico County, by watershed. Data from MBSS 1994-2004, MBSS qualitative data, Raesly, unpub. data, Harris 1975, Thompson 1984, and DNR Natural Heritage Program database.

